

REMARKS

Claims 1 and 3-13 are pending in the present Application. Claims 1 and 3-13 have been amended, leaving Claims 1 and 3-13 for consideration upon entry of the present Amendment. The Specification has been amended as explained in detail below. No new matter has been introduced by these amendments. Reconsideration and allowance of the claims are respectfully requested in view of the above amendments and the following remarks.

Amendments to the Specification

The specification has been amended to delete “anhydrous phthalic acid”, “anhydrous tetrahydrophthalic acid”, and “trimellitic anhydride” from examples of the polybasic acid, to distinguish from the anhydrous polybasic acid. No new matter has been introduced by this amendment.

Amendments to the Claims

Claims 1 and 3-13 have been amended to more clearly claim the invention, and to correct certain nomenclature and typographical errors. No new matter has been introduced by these amendments.

Claim 1 has been amended to recite “for undercoating a pre-coated metal steel sheet”. No new matter has been introduced by this amendment. Support for this amendment can be found at least in the Application as filed, page 1, lines 10-15.

Claim 1 has also been amended to further claim the thermoplastic polymer as disclosed in the Application. The limitations “obtained by condensing polyethylene terephthalate using glycol and polybasic acid” and “wherein polyethylene terephthalate is synthesized by using terephthalic acid and ethylene glycol, a mixing ratio of terephthalic acid and ethylene glycol being about 1.0 : 1.0-1.4 by equivalent” have been deleted and the limitations “reacting terephthalic acid with ethylene glycol in a molar ratio of terephthalic acid to ethylene glycol of about 1:1 to about 1:1.4 to produce polyethylene terephthalate” and “condensing the polyethylene terephthalate with a glycol and a polybasic acid to produce a thermosetting polyester resin” have been added, to clarify the claim. No new matter has been introduced by this amendment. Support can be found at least in the present Application as

filed, page 5, lines 14-22.

Claim 1 has also been amended to recite “adding an [amine] into the product until the pH of the product is about 7 to about 9”. No new matter has been introduced by this amendment. Support can be found at least in the Application as filed, page 5, lines 25-26.

Claim 3 has been amended to more clearly recite the limitations thereof by replacing “about 20-30”, “about 50-120”, and “about 8,000-20,000” with “about 20 to about 30”, “about 50 to about 120”, and “about 8,000 to about 20,000”. No new matter has been introduced by this amendment.

Claim 4 has been amended to more clearly recite the limitations thereof by replacing “about 60-80” and “about 50-120” with “about 60 to about 80” and “about 50 to about 120”, and to delete “pH of about 7-9”. No new matter has been introduced by this amendment.

Claim 5 has been amended to recite “for undercoating a pre-coated metal steel sheet”. No new matter has been introduced by this amendment. Support for this amendment can be found at least in the Application as filed, page 1, lines 10-15.

Claim 5 has also been amended to more clearly recite the process disclosed in the Application. The limitations “preparing a polyester resin by adding glycol and polybasic acid into polyethylene terephthalate and condensing a resultant mixture, wherein polyethylene terephthalate is synthesized by using terephthalic acid and ethylene glycol, a mixing ratio of terephthalic acid and ethylene glycol being about 1.0 : 1.0-1.4 by equivalent” and “through the ring opening addition or condensation polymerization reaction becomes” have been deleted and the limitations “reacting terephthalic acid with ethylene glycol in a molar ratio of terephthalic acid to ethylene glycol of about 1:1 to about 1:1.4 to produce polyethylene terephthalate”, “condensing the polyethylene terephthalate with a glycol and a polybasic acid to produce a thermosetting polyester resin”, and “reacting about 100 parts by weight of the thermosetting resin with about 5 to about 20” have been added, to clarify the claim. No new matter has been introduced by this amendment. Support can be found at least in the present Application as filed, page 5, lines 14-22.

Claim 6 has been amended to recite “thermosetting” before “polyester”, “a” before “glycol” and “polybasic acid”. Claim 6 has further been amended to replace “mixing ratio of

1.0 : 1.0-1.1 by equivalent" with "molar ratio of the glycol to the polybasic acid of about 1:1 to about 1:1.1", and to more clearly recite the limitations thereof by replacing "about 20-30" with "about 20 to about 30", "about 50-120" with "about 50 to about 120", and "about 8,000-20,000" with "about 8,000 to about 20,000". No new matter has been introduced by these amendments which are solely for clarification and nomenclature.

Claim 7 has been amended to recite "the" before glycol. No new matter has been introduced by this amendment.

Claim 8 has been amended to recite "the" before "polybasic acid", and to delete "anhydrous phthalic acid", "anhydrous tetrahydronphthalic acid", and "trimellitic anhydride". No new matter has been introduced by this amendment, which is entered to reflect the amendment to the specification discussed above.

Claim 9 has been amended to recite "the" before "anhydrous polybasic acid". No new matter has been introduced by this amendment.

Claim 10 has been amended to recite "the" before "amine." No new matter has been introduced by this amendment.

Claim 11 has been amended to more clearly recite the limitations thereof by replacing "about 50-60 %" with "about 50 to about 60 percent by weight". No new matter has been introduced by this amendment.

Claim 12 has been amended to delete "pH of about 7-9", and to more clearly recite the limitations thereof by replacing "about 60-80" and "about 50-120" with "about 60 to about 80" and "about 50 to about 120". No new matter has been introduced by this amendment.

Claim 13 has been amended to add a "," (comma) after "claim 1", and to more clearly recite the limitations thereof by replacing "about 1,500-2,000" with "about 1,500 to about 2,000". No new matter has been introduced by this amendment.

Claim Rejections Under 35 U.S.C. § 112, First Paragraph

Claims 1 and 3-13 stand rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the Specification in such a way as to reasonably convey to one skilled in relevant art that the inventors, at the time the application was filed,

had possession of the claimed invention. Specifically, the identities of the polybasic acid and the anhydrous polybasic acid are not enabled by the Specification. At page 8 (lines 4-7), the Specification teaches the use of polybasic acids that may embrace the anhydrous polybasic acid as disclosed at page 9 (lines 20-22), yet a distinction in nomenclature is presented in the claims. Applicants respectfully traverse this rejection in light of the foregoing amendments to the claims.

The Specification and claims have been amended to limit anhydrous compounds to anhydrous polybasic acids as discussed above. Withdrawal of the rejection and allowance of the claims is respectfully requested.

Claim Rejections Under 35 U.S.C. § 112, Second Paragraph

Claims 1 and 3-13 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, the recitation in claim 1 of “condensing polyethylene terephthalate using glycol and polybasic acid” renders the claim as vague. Applicants respectfully traverse this rejection.

Claims 1 and 5 have been amended to more clearly recite the invention as described above. Withdrawal of the rejection and allowance of the claims is respectfully requested.

Claim Rejections Under 35 U.S.C. § 103(a)

Claims 1 and 3-13 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over U.S. Patent No. 5,686,553 to Tai et al. (“Tai”). Applicants respectfully traverse this rejection.

Tai teaches polyesters of terephthalic acid units and ethylene glycol units, having excellent melt moldability. Tai also teaches molded articles prepared from the polyesters. Tai, abstract.

Presently disclosed is a water soluble thermosetting polyester resin composition for undercoating a PCM steel sheet, the thermosetting polyester prepared from polyethylene terephthalate, a glycol, a polybasic acid, an anhydrous polybasic acid, and an amine.

Application as filed, Abstract.

Applicants respectfully assert that independent claims 1 and 5, and dependent claims 3-4 and 6-13 from which they depend, are patentable over Tai under 35 U.S.C. § 103(a).

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing a *prima facie* case of obviousness, i.e., that all elements of the invention are disclosed in the prior art; that the prior art relied upon, coupled with knowledge generally available in the art at the time of the invention, contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references; and that the proposed modification of the prior art had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970); *Amgen v. Chugai Pharmaceuticals Co.*, 927 U.S.P.Q.2d, 1016, 1023 (Fed. Cir. 1996).

Presently disclosed is a water soluble thermosetting polyester resin composition for undercoating a pre-coated metal steel sheet. The thermosetting polyester resin composition is prepared according to steps recited in amended claims 1 and 5. The steps comprise reacting terephthalic acid with ethylene glycol to produce polyethylene terephthalate, condensing the polyethylene terephthalate with a glycol and a polybasic acid to produce a thermosetting polyester resin, the thermosetting polyester resin is reacted with an anhydrous polybasic acid, and then adding an amine to the product.

However, these steps which allow for a controlled synthesis of the water soluble thermosetting polyester in the present Application are not taught nor suggested by Tai. Instead, Tai teaches the simultaneous addition of all the components in order to produce a copolymer, i.e., the terephthalic acid, ethylene glycol, bifunctional compound, multifunctional compound, and amine are added at the same time. Thus, the method taught by Tai is substantially different from the method disclosed by Applicants, and as appreciated by one skilled in the art, the thermosetting polyester resin composition of the present Application has a chemical structure that is substantially different from that of Tai. Tai therefore fails to disclose all elements of Claims 1 and 5 and dependents, and cannot make these claims

unpatentable.

Further, Applicants disclose that the thermosetting polyester resin composition is water soluble. This water solubility is affected by addition of the amine, which neutralizes acidic sites in the thermosetting polyester resin and thereby imparts a hydrophilic property to the thermosetting polyester resin. See Specification as filed, p. 5, lines 25-26. Tai, however, teaches the use of an amine (e.g., triethylamine) to suppress the formation of diethylene glycol and to reduce its presence in the copolymers. Tai, column 29, lines 44-51. One skilled in the art will understand that the use of an amine to suppress the formation of diethylene glycol as in Tai does not adequately teach the use or amount of an amine to impart hydrophilicity to the copolymer. Tai is silent as to the amount of amine required for glycol suppression. In contrast, the instant specification teaches and the claims claim the inclusion of amine to achieve a pH for the polyester resin composition of about 7 to about 9, thus defining an amount of the amine as claimed in Claim 1 and 5. Thus, the water soluble thermosetting polyester resin composition of the present Application has a hydrophilic property that is substantially different from that of the copolymer taught by Tai. Tai thus does not disclose the amine as claimed, and fails to teach the use of an amine as a neutralizing agent, and thereby fails to provide a suggestion or incentive that would induce one skilled in the art to modify Tai to achieve the water soluble thermosetting polyester resin as claimed in the instant Claims. Tai thus does not make the instant claims unpatentable.

In addition, Applicants respectfully assert that the disclosed water soluble thermosetting polyester resin can be used for undercoating a pre-coated metal steel sheet, as claimed in independent claims 1 and 5 as currently amended. This function can be achieved without environmental contamination, harm to the human body, or danger for initiating a fire, because the undercoating excludes the use of an organic solvent. Application as filed, page 25, lines 14-18. This feature is not taught nor suggested by Tai. Tai further discloses molding, particularly blow molding, of the copolymers disclosed therein, and mentions that the copolymers may have the shape of laminates with other materials such as metals, but does not disclose undercoating pre-coated metal steel sheet as claimed in the instant claims. Tai, column 30, lines 60-65. Thus, Tai does not disclose all elements of the instant claims, and

therefore does not render the instant claims unpatentable.

Finally, as acknowledged by the Examiner in the Office action dated November 3, 2006, on p. 4, lines 9-11, Tai does not disclose the acid values, hydroxyl values, or molecular weight of copolyester resin disclosed therein. Applicants respectfully assert however, that these properties are defined in the present application and claimed in Claims 6, 12, and 13 comprise limitations useful in an embodiment of the practice of the current invention, and provide performance of the claimed composition, and that as Tai does not teach these values, Tai fails to disclose all elements of these Claims. Therefore, Tai cannot render the Claims 6, 12, and 13 unpatentable.

Thus, for at least the above reasons, Applicants respectfully assert that claims 1 and 3-13 are patentable over Tai under 35 U.S.C. § 103(a), because Tai does not teach nor suggest each element of the claims, nor provide an expectation for success in modifying Tai, and thus the Examiner did not establish a *prima facie* case of obviousness. Withdrawal of the rejection and allowance of the claims is respectfully requested.

It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and allowance are requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130.

Respectfully submitted,

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